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RESEARCH PAPER

Genetic diversity studies in rice (*Oryza sativa* L.) genotypes with high iron content in grains using microsatellite markers

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Abstract : Rice is the most important staple food grain with regard to human nutrition and calorie intake providing more than one-fifth of the calories consumed worldwide by the humans. Biofortification of staple food crops has thus been considered a sustainable strategy to overcome the problem of micronutrient deficiencies prevalent in rice. The present study was conceptualized and executed with the prime objective of studying the genetic diversity of ninty six genotypes of rice with high iron content in grains using two SSR markers *viz*., SC 120 and SC 123 based on the yellow stripe like genes derived from the genomic regions associated with iron metabolism. No significant grouping based on the iron content in the grains could be obtained as the trait of iron accumulation in grains is controlled by many genes and the markers used in this study were of limited number, more markers preferably functional markers would elicit the genetic diversity of the characterized genotypes.

Key Words : Genetic diversity, Grain iron, SSRs

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INTRODUCTION

Rice (*Oryza sativa* L.) occupies an enviable prime place among the food crops cultivated around the world. It is the principal food for more than half of the world's population (Sasaki and Burr, 2000) and has been estimated that 50 per cent of the human population depends on rice as a main source of nutrition (White, 1994). Domestication of food crops and their subsequent genetic improvement resulting into an era of 'green revolution' was mainly aimed at increasing yields and tolerance to biotic and abiotic stresses, and as a consequence inadvertently sidelining the nutritional traits of crop plants.

Nutritional deficiencies account for almost two-third of the childhood death worldwide. Most of these afflicted are dependent on staple crops such as rice, wheat and maize for their sustenance. Those afflicted cannot afford the fortified food to meet out the micronutrient requirement. Although rice is not considered a major mineral source in the diet, any increase in its mineral concentration could significantly help reduce iron deficiency in humans because of the high levels of rice consumption among the poor in Asia. Thus, micronutrient enrichment of staple food crops has been considered a sustainable strategy to tackle the problem of micronutrient deficiencies.

The increase in iron content in plant staple foods can serve as a vector for iron ingestion in target populations, minimizing nutritional problems (Vansuyt *et al.*, 2000). In this regard, a better understanding of iron homeostasis, involving knowledge of the basic physiological processes of iron absorption, distribution and storage in plants, can serve as

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